

**REMARKS**

Favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Initially, Applicants wish to express their appreciation to Examiner Zeman and Supervisory Examiner Wortman for their courtesy and assistance provided to the Applicant's undersigned representative during the personal interview held on March 28, 2002.

New claims 37-43 are added for additional patent protection. These claims are dependent upon claim 16 and more particularly define the preferred embodiments and unexpected features of this invention over the prior art. New claim 37 is supported in the specification at page 16, line 22. New claim 38 is supported in the specification at page 15, line 21. New claim 39 is supported in the specification at page 17, lines 22-28. New claim 40 is supported in the specification at page 17, line 27. New claim 41 is supported in the specification at page 17, line 28. New claim 42 is supported in the specification at page 17, lines 27-28. New claim 43 is supported in the specification at page 17, line 22.

Turning to the last Official Action issued in the parent application, there was a single ground of rejection of the elected claims. Claims 16-27 were rejected under 35 USC 103 as being unpatentable over Piasio in view of either Joris et al. or Zhu et al. This ground of rejection is again respectfully traversed as discussed during the interview.

The process of the claimed invention is similar to the process of Piasio, except that the claimed process uses a recognition agent comprising a receptor that specifically binds to antibiotics containing a  $\beta$ -lactam ring which is obtained from the *Bacillus licheniformis*. The receptor from the *Bacillus licheniformis* provides the claimed process with an unexpectedly superior sensitivity and rapidity for detecting the presence of antibiotics containing a  $\beta$ -lactam ring in a sample.

For example, the process according to the present invention is capable of detecting an antibiotic in a test sample in 5 minutes or less. In contrast, the Piasio process is at best able to detect an antibiotic in a test sample in no less than 8 minutes (see column 6, line 46), and generally up to 12 to 15 minutes. See column 2, lines 19-20 and column 1, lines 45-46.

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Furthermore, the process of the present invention is capable of detecting penicillin G at a concentration of 3 ppb, which is a significantly superior sensitivity to the detection capability of the Piasio process of 5 ppb (see column 6, line 44).

The process of the present invention is further capable of detecting ampicillin at a concentration of 4 ppb, which is substantially superior to the Piasio process of 10 ppb sensitivity (column 6, Table II, line 65).

Moreover, the process of the present invention is capable of detecting amoxycillin at a concentration of 4 ppb, in comparison to the Piasio process of 5 ppb (column 6, Table II, line 64).

The unexpectedly superior sensitivity of the claimed process over the Piasio process is very important. Presently the U.S. and the European Union have specified maximum amounts of antibiotics which may be contained in food products such as milk. The European Union has a maximum limit of 4 bbp for each of penicillin G, ampicillin, amoxycillin. Accordingly, as shown by Table II in the Piasio patent, the Piasio patent is incapable of detecting these three antibiotics at the sensitivity level demanded. On the other hand, the claimed process is capable of detecting levels at or lower than the maximum specified limit. The key feature of the claimed process which enables this unexpectedly greater sensitivity is the discovery by the present inventors of the unexpectedly superior properties of receptors taken from *Bacillus licheniformis* for binding to antibiotics containing a  $\beta$ -lactam ring.

In addition to the foregoing points, the Applicant has conducted a comparative experiment in an effort to further demonstrate the unexpected superiority of the claimed process over the closest prior art. The experimental description and results are submitted herewith as Appendix 1. A formal Rule 132 Declaration can be submitted in the future if deemed helpful to patentability.

The experiment compares the sensitivity of the Applicant's commercial test, called Beta Star test, which is constructed and performed in accordance with the claimed process, with a commercial test called Delvo-X-Press, for detecting antibiotics containing a  $\beta$ -lactam ring. A technical brochure describing the Beta Star and Delvo-X-Press tests are attached hereto as Appendixes 2 and 3, respectively. It is respectfully submitted that such comparison is appropriate for showing unexpected results of the claimed process over Piasio.

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The sensitivity of Delvo-X-Press antibiotic test according to the manufacturer is identical to the sensitivity of the test of Piasio. The Delvo test also uses the identical assay procedure described in the Piasio patent. See the page entitled "Assay Procedure", which states:

"1. Incubate milk and tracer for 2 minutes in ampule at 64°C. (Note that the Piasio test is also conducted at 64°C for 2 minutes (see column 6, lines 25-29)).

2. Transfer contents of ampule to coated tube and incubate 2 minutes at 64°C. (Note this step is also identical to the Piasio test. See column 6, lines 28-29).

3. Wash coated tube with wash solution and add color developer (see column 6, lines 30-36 of Piasio).

4. Incubate 4 minutes at room temperature and stop reaction with stop solution (see column 6, lines 36-38 of Piasio).

5. Read results in Delvo-X-Press reader and record results. (column 6, lines 38-40)."

The Applicant has been unable to obtain information from the Delvo manufacturer to identify the strain of bacteria from which the  $\beta$ -lactam ring receptor used in the test is obtained. It is believed that the strain is *Bacillus stearothermophilus*, since this is a thermo-resistant strain having an optimum incubation temperature of 64°C.

The Applicant has located a publication via an internet search, entitled "Monitoring Antibiotics in Milk-The Changing World of Test Methods" by Paul Neaves, published in 1999. This publication was presented at a British Mastitis Conference relating to some Delvo-X-Press tests, in which *Bacillus stearothermophilus* is identified as the recognition agent used in the test kits. Please see page 4, paragraph one, lines 1-4 of the publication attached hereto as Appendix 4.

In summary, although it is not possible to determine with 100% certainty that the Delvo-X-Press test uses *Bacillus stearothermophilus*, there is a reasonably high probability that the test is the same as the Piasio test. Furthermore, it is respectfully submitted that the features of the Delvo-X-Press test are so similar, for example with respect to the identical assay procedure, the identical antibiotic sensitivity, etc., to the Piasio test that the comparative showing presented herewith is convincing of the unexpected results of the claimed invention over the Piasio process.

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In view of the foregoing, it is respectfully submitted that the claimed invention is clearly patentable and not suggested by the cited references. Accordingly, allowance is solicited.

Respectfully submitted,

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